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L11: Entry 110 of 121

File: USPT

Aug 29, 2000

US-PAT-NO: 6112210

DOCUMENT-IDENTIFIER: US 6112210 A

TITLE: Apparatus and method for null representation in database object storage

DATE-ISSUED: August 29, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nori; Anil	Fremont	CA		
Weisz; John	Belmont	CA		
Muralidhar; Subramanian	Sunnyvale	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Oracle Corporation	Redwood Shores	CA			02

APPL-NO: 08/ 962416 [\[PALM\]](#)

DATE FILED: October 31, 1997

INT-CL: [07] [G06](#) [F](#) [17/30](#)

US-CL-ISSUED: 707/103

US-CL-CURRENT: [707/103R](#)

FIELD-OF-SEARCH: 707/103, 707/203

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5437027	July 1995	Bannon et al.	707/103
<input type="checkbox"/>	5701472	December 1997	Koerber et al.	707/203
<input type="checkbox"/>	5838965	November 1998	Kavanagh et al.	707/103

ART-UNIT: 277

PRIMARY-EXAMINER: Amsbury; Wayne

ASSISTANT-EXAMINER: Lewis; Cheryl

ATTY-AGENT-FIRM: McDermott, Will & Emery

ABSTRACT:

An apparatus and process for storing representations of information objects having null values in a database are disclosed. A null object is established in memory associated with an information-bearing object. The null object has an attribute null value corresponding to each data-bearing attribute of the information-bearing object. Each attribute null value is set to a value indicating whether the corresponding attribute of the information-bearing object is null, not null, or not capable of having a null value. The null object also has an atomic null value that indicates whether the entire information-bearing object is null. When the information-bearing object is to be accessed, the null object is first accessed to determine whether the entire information-bearing object or any attributes thereof are null. Accordingly, unnecessary retrieval and manipulation of the information-bearing object is avoided.

45 Claims, 12 Drawing figures

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L11: Entry 112 of 121

File: USPT

Aug 22, 2000

US-PAT-NO: 6108664

DOCUMENT-IDENTIFIER: US 6108664 A

TITLE: Object views for relational data

DATE-ISSUED: August 22, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nori; Anil	San Jose	CA		
Hong; Chin	Hillsborough	CA		
Wijaya; Joyo	Menlo Park	CA		
Cheng; Tze-Pin	Milpitas	CA		
Kooi, deceased; Robert P.	late of Lafayette	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Oracle Corporation	Redwood Shores	CA			02

APPL-NO: 08/ 962415 [PALM]

DATE FILED: October 31, 1997

PARENT-CASE:

RELATED APPLICATION The present application is related to U.S. patent application Ser. No. 08/961,740, entitled "REFERENCES TO GLOBAL DATABASE OBJECTS", pending filed by Chin-Heng Hong, Sudheer Thakur, Anil Nori, Joyo Wijaya, on the equal day herewith, the contents of which are incorporated herein by reference. U.S. patent application Ser. No. 08/961,794, entitled "APPARATUS AND METHOD FOR PICKLING DATA", pending filed by John Wiesz, on the equal day herewith, the contents of which are incorporated herein by reference. U.S. patent application Ser. No. 08/962,409, entitled "APPARATUS AND METHOD FOR OBJECT REPRESENTATION AND STORAGE IN A RELATIONAL DATABASE SYSTEM", pending filed by Anil Nori, John Weisz, Vikas Arora, Subramanian Muralidhar, on the equal day herewith, herein referred to as, the contents of which are incorporated herein by reference. U.S. patent application Ser. No. 08/962,535, entitled "APPARATUS AND METHOD FOR STORAGE OF OBJECT COLLECTIONS IN A DATABASE SYSTEM", pending filed by Anil Nori, Vishu Krishnamurthy, Vikas Arora, Srinath Krishnaswamy, on the equal day herewith, the contents of which are incorporated herein by reference. U.S. patent application Ser. No. 08/962,416, entitled "APPARATUS AND METHOD FOR NULL REPRESENTATION IN DATABASE OBJECT STORAGE", pending filed by Anil Nori, John Weisz, Subramanian Muralidhar, on the equal day herewith, the contents of which are incorporated herein by reference.

INT-CL: [07] G06 F 17/30

US-CL-ISSUED: 707/103; 707/102, 707/104

US-CL-CURRENT: 707/103R; 707/102, 707/104.1

FIELD-OF-SEARCH: 707/103, 707/2, 707/10, 707/101, 707/102, 707/104, 711/203, 345/348

PRIOR-ART-DISCLOSED:

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	<u>5335346</u>	August 1994	Fabbio	395/600
<input type="checkbox"/>	<u>5426747</u>	June 1995	Weinreb et al.	711/203
<input type="checkbox"/>	<u>5448727</u>	September 1995	Annevelink	707/101
<input type="checkbox"/>	<u>5560005</u>	September 1996	Hoover et al.	707/10
<input type="checkbox"/>	<u>5615367</u>	March 1997	Bennett et al.	707/102
<input type="checkbox"/>	<u>5680563</u>	October 1997	Edelman	345/348
<input type="checkbox"/>	<u>5724575</u>	March 1998	Hoover et al.	707/10
<input type="checkbox"/>	<u>5752018</u>	May 1998	Sheffield	707/2
<input type="checkbox"/>	<u>5765159</u>	July 1998	Srinivasan	707/102
<input type="checkbox"/>	<u>5809297</u>	September 1998	Kroenke et al.	707/102
<input type="checkbox"/>	<u>5815710</u>	September 1998	Martin et al.	709/303
<input type="checkbox"/>	<u>5832498</u>	November 1998	Exertier	707/103
<input type="checkbox"/>	<u>5907846</u>	May 1999	Brener et al.	707/103
<input type="checkbox"/>	<u>5926819</u>	July 1999	Doo et al.	707/104
<input type="checkbox"/>	<u>5937409</u>	August 1999	Wetherbee	707/103
<input type="checkbox"/>	<u>5995973</u>	November 1999	Daudenarde	707/103

ART-UNIT: 271

PRIMARY-EXAMINER: Alam; Hosain T.

ASSISTANT-EXAMINER: Colbert; Ella

ATTY-AGENT-FIRM: Hickman Palermo Truong & Becker, LLP Hickman; Brian D. Bingham; Marcel K.

ABSTRACT:

A method and apparatus for presenting and modifying data from a set of tables in a database is provided. A view that is defined is based on a set of one or more tables that may include relational tables or object tables. The view defines a presentation of data from the one or more tables as a set of objects that reside in the database. Data is read from the one or more rows of the tables based on the view, and is presented as a set of objects that reside in the database. An object id that is based on data from the one or more rows is generated and associated with each object presented. The view may specify which columns from the one or more

tables contain values used to generate the object ids. A trigger may associated with the view. The set of objects presented may be presented as objects having an attribute that is a column object. Column objects include user specified object types, collection objects (e.g. nested tables and variable arrays), or references to objects.

39 Claims, 20 Drawing figures

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L11: Entry 111 of 121

File: USPT

Aug 29, 2000

US-PAT-NO: 6112207

DOCUMENT-IDENTIFIER: US 6112207 A

TITLE: Apparatus and method which features linearizing attributes of an information object into a string of bytes for object representation and storage in a database system

DATE-ISSUED: August 29, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nori; Anil	San Jose	CA		
Weisz; John	Belmont	CA		
Arora; Vikas	Mountain View	CA		
Muralidhar; Subramanian	Foster City	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Oracle Corporation	Redwood Shores	CA			02

APPL-NO: 08/ 962409 [\[PALM\]](#)

DATE FILED: October 31, 1997

INT-CL: [07] [G06 F 17/30](#)

US-CL-ISSUED: 707/101; 707/103

US-CL-CURRENT: [707/101](#)

FIELD-OF-SEARCH: 707/103, 707/101

PRIOR-ART-DISCLOSED:

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5291583	March 1994	Bapat	395/705
<input type="checkbox"/>	5806066	September 1998	Golshani et al.	707/100
<input type="checkbox"/>	5857203	January 1999	Kauffman et al.	707/200
<input type="checkbox"/>	5878411	March 1999	Burroughs et al.	707/4
<input type="checkbox"/>	5911139	June 1999	Jain et al.	707/3

<input type="checkbox"/>	<u>5918225</u>	June 1999	White et al.	707/3
<input type="checkbox"/>	<u>5946467</u>	August 1999	Pathakis et al.	709/236

ART-UNIT: 271

PRIMARY-EXAMINER: Black; Thomas G.

ASSISTANT-EXAMINER: Trinh; William

ATTY-AGENT-FIRM: Hickman Palermo Truong & Becker, LLP Hickman; Brian D.

ABSTRACT:

An apparatus and process for storing information objects in a database are disclosed. An information object, instantiated according to an abstract data type having a plurality of attributes, is pickled into an image that contains all values stored in the object in a linearized representation. In one embodiment, the entire image is stored in a single column of a table of the database. In another embodiment, each portion of the image associated with one of the attributes is stored in a separate column of the database table.

23 Claims, 12 Drawing figures

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<u>L27</u>	111 and L26	68	<u>L27</u>
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<u>L25</u>	707/103r	1054	<u>L25</u>
<u>L24</u>	707/3	5310	<u>L24</u>
<u>L23</u>	707/2	3338	<u>L23</u>
<u>L22</u>	707/102	3778	<u>L22</u>
<u>L21</u>	707/10	7148	<u>L21</u>
<u>L20</u>	707/4	3145	<u>L20</u>
<u>L19</u>	707/1	5473	<u>L19</u>
<u>L18</u>	5937409.pn. and 111	0	<u>L18</u>
<u>L17</u>	111 and 5937409.pn.	0	<u>L17</u>
<u>L16</u>	111 and 5995973.pn.	0	<u>L16</u>
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<u>L14</u>	111 and 5701472.pn.	0	<u>L14</u>
<u>L13</u>	111 and 5838965.pn.	0	<u>L13</u>

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<u>L10</u>	L9 and object near oriented	135	<u>L10</u>
<u>L9</u>	L8 and metadata	255	<u>L9</u>
<u>L8</u>	L7 and table	854	<u>L8</u>
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<u>L6</u>	database near server	14314	<u>L6</u>
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<u>L2</u>	L1 and database near server	1	<u>L2</u>
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<u>L12</u>	L11 and database near server	71	<u>L12</u>
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<u>L9</u>	L8 and object near oriented near database	938	<u>L9</u>
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